



Report to the Common Council Regarding 106-108 and 118 Newfield Street



Hartford Courant- 2010

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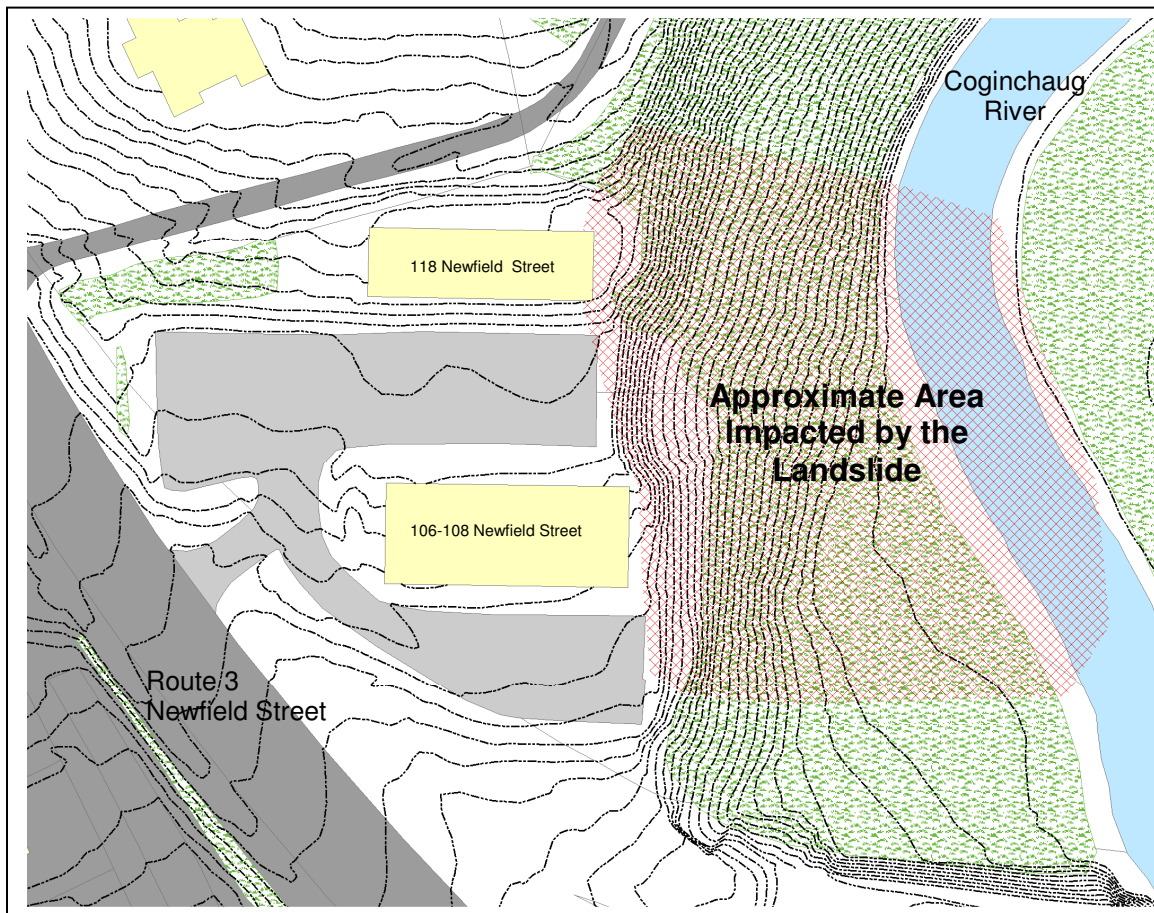
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Summary- In reviewing the available information, there are likely a number of factors that likely contributed to the landslide, but this report can only make assumptions that are not backed up with technical or expert review. There are two contributing factors; weather and poor property maintenance are likely to have caused the landslide of March 30, 2010.

Summary

Site Characteristics

The properties in question are 106-108 Newfield Street and 118 Newfield Street. The two lots comprise a total land area of 4.27 acres. The topography of both lots are gentle sloping to steep sloping eastward towards the Coginchaug River which abuts the property on the east side as displayed on the topographic map. There has always been a very steep natural slope abutting the Coginchaug River. The developed portion of the property is located on the western half of the property, approximately 50 feet above the Coginchaug River. The properties are developed with two multifamily apartment buildings, with 44 one-bedroom apartments, and two parking lots, with 70 parking spaces.



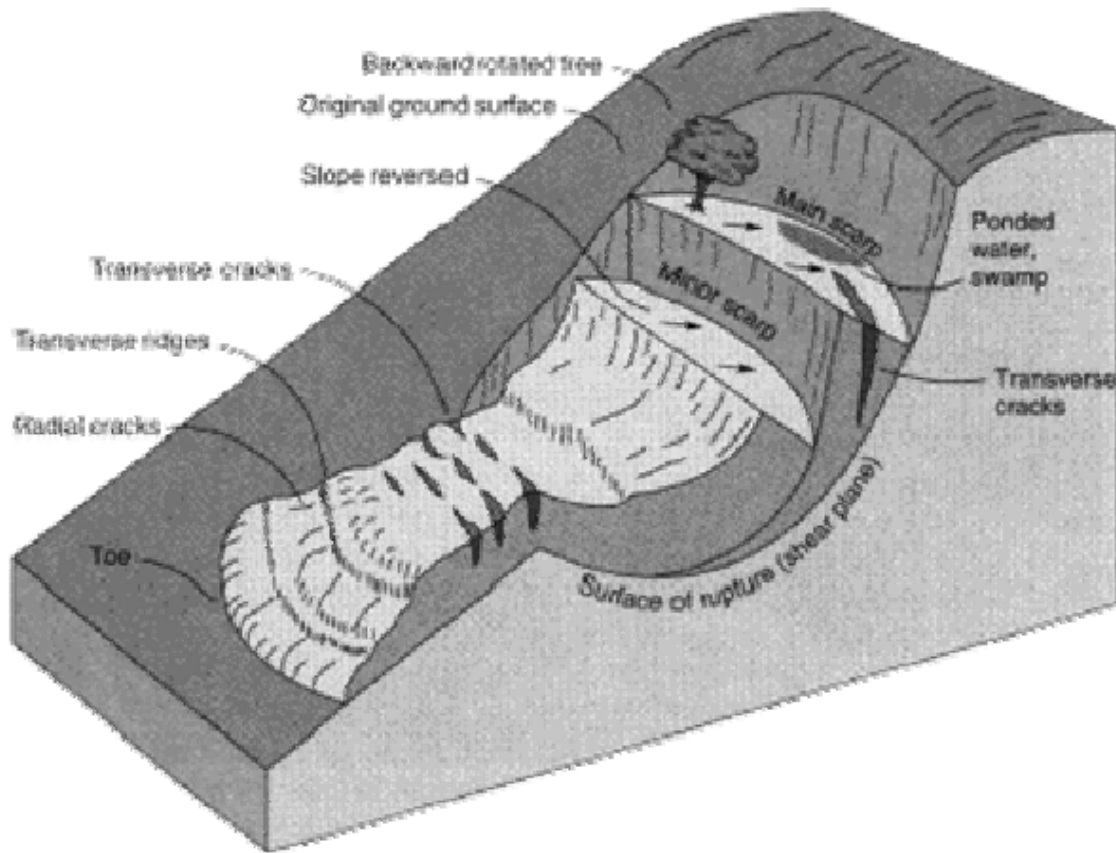
Landslide

On March 30, 2010 at 3:30pm the Middletown Dispatch center received a phone call reporting a landslide had taken place near two apartment buildings at 106-108 Newfield Street and 118 Newfield Street. The two buildings with 44 units were evacuated due to the fact that the eastern section of 118 Newfield Street had its foundation expose. 106-108 Newfield Street did not have its foundation exposed, but a thin strip of earth was all that separated the building from the drop off caused by the landslide.

The landslide affected an area of one acre. The width of the affected area was 250 feet and traveled possibly as far as 200 feet. The landslide deposited a significant

amount of debris into the Coginchaug River. The result of which has dammed the river, raising the normal river depth by as much as four feet for a distance of 4,000 feet.

Diagram of a Debris Slide



ussartf.org/landslides.htm

The most accurate description of the event is something that is known as a debris slide. This is a “slide of coarse-grained soil, most common in unconsolidated sandy or gravelly units, but also are common in residual soils that form from in-place weathering of relatively hard rock. Owing to the granular constituents, overall strength of the debris slide mass generally is higher than that of earth flows, but there may be a very low strength zone at the base of the soil or within weathered bedrock. Debris slides typically move initially as shallow intact slabs of soil and vegetation, but break up after a short distance into falls and flows. Movement of the slide mass as a shallow slab leads to a smooth, steep, commonly curved scar. The debris is deposited at the base as a loose hummocky mass, although the deposit may be rapidly removed by erosion.

Debris slides commonly occur on very steep slopes, as steep as 60% to 70%, usually in an area where the base of a slope is undercut by erosion. Debris slides form steep, unvegetated scars which are likely to remain unvegetated for years. Revegetated scars can be recognized by their steep slopes, and a shallow amphitheater morphology.

A single heavy rainstorm or series of storms may deliver enough rain to trigger debris slides. Individual debris slides may move at rates ranging from meters per day to meters per minute. Debris slide scars are extremely steep and therefore are very sensitive to renewed disturbance. Natural erosion at the base of debris slide scars may trigger

additional slides. Cutting into the base of a debris slide scar may also trigger renewed slides. Even without additional disturbance, debris slide scars tend to ravel and erode, leading to small rock falls and debris slides from the same slope.” (CA- Dept. of Conservation: California Geological Survey)

Weather

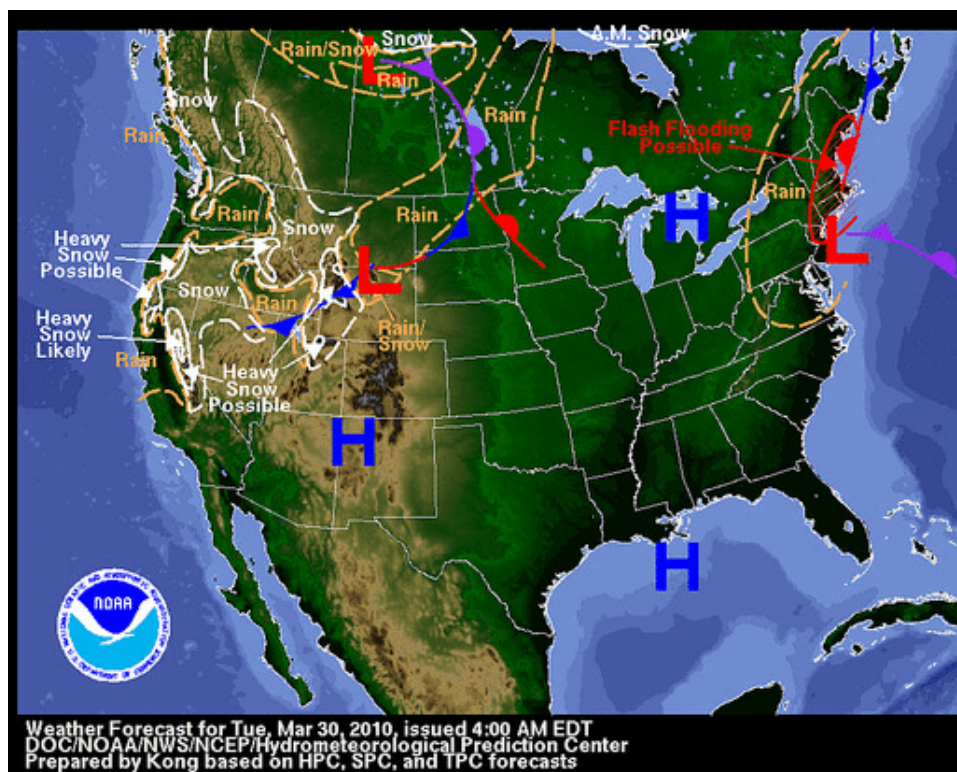
March 2010 was a particularly active weather month with 15 days of precipitation. Four of those days had flash flood warnings issued by NOAA, which included the day of the landslide. The month experienced 9.56 inches of rain, the average for March is 4.55 inches. During this time the Connecticut River exceeded its flood stage of 8 feet and set a new record for the 20th highest recorded level at 12.96 feet on April 2, 2010. These conditions certainly fully saturated the toe of the slope perhaps more than ever before.

History for KCTMIDDLE5

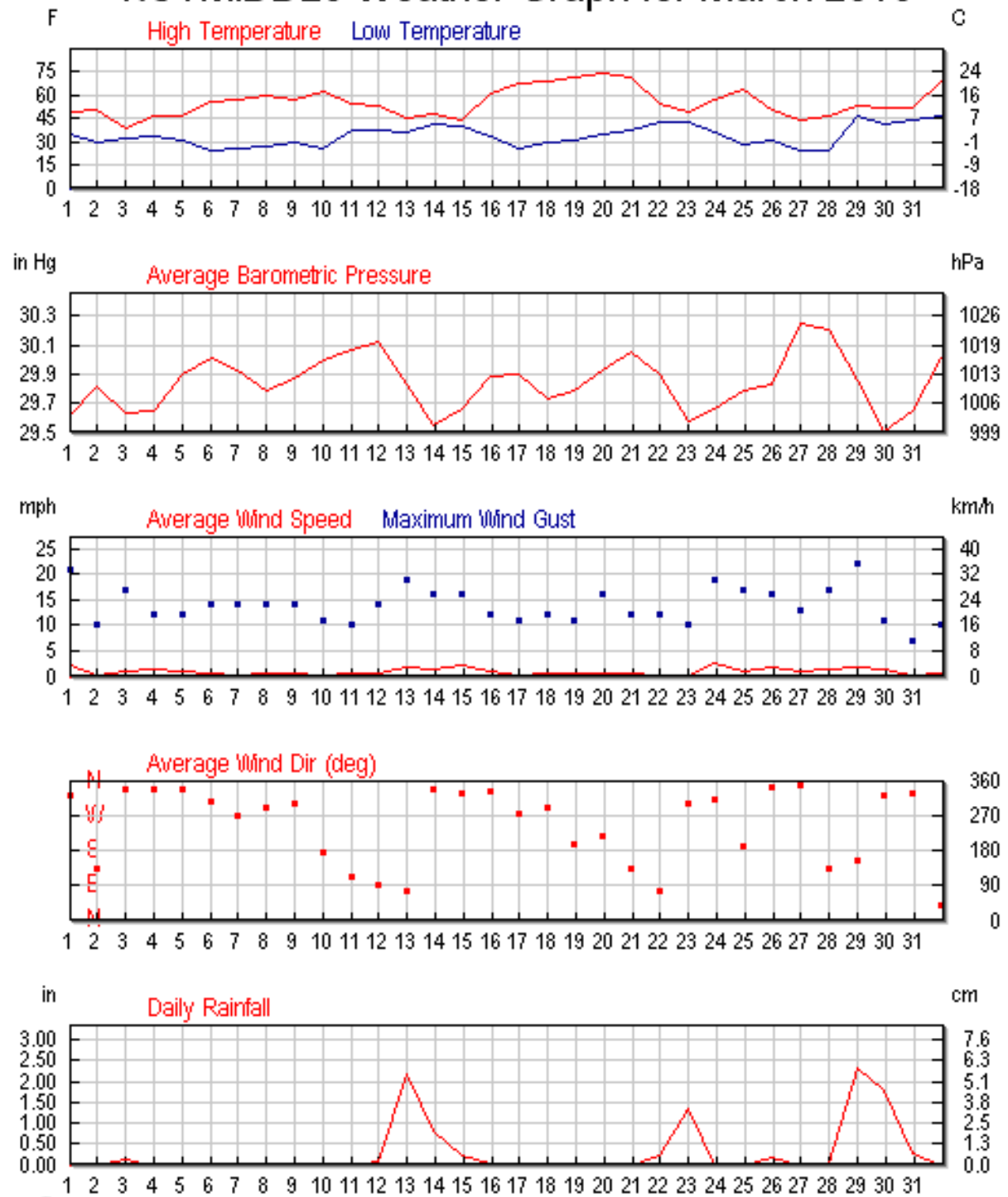
Valley Dr, Middletown, CT — [Current Conditions](#)

Monthly Summary for March, 2010				
« Previous Month		March	30	2010
		View		Next Month »
Daily	Weekly	Monthly		Yearly
			Custom	
	High:	Low:		Average:
Temperature:	74.4 °F	24.2 °F		44.1 °F
Dew Point:	53.9 °F	-2.9 °F		31.8 °F
Humidity:	99.0%	16.0%		66.9%
Wind Speed:	22.0mph from the SE	-		0.9mph
Wind Gust:	22.0mph from the ESE	-		-
Wind:	-	-		WSW
Pressure:	30.40in	29.31in		-
Precipitation:	9.56in			

www.wunderground.com



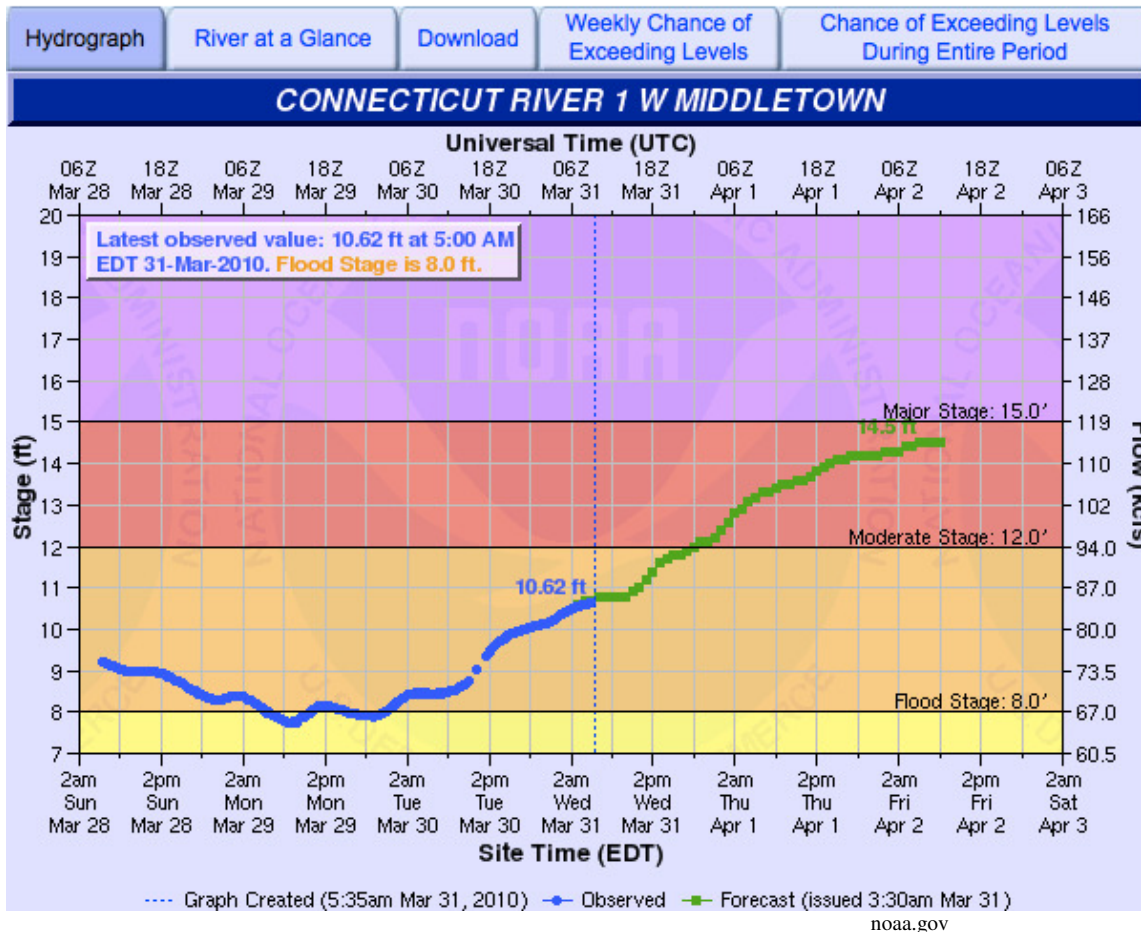
KCTMIDDLE5 Weather Graph for March 2010



Weather Underground®
wunderground.com

www.wunderground.com

http://www.hpc.ncep.noaa.gov/noaa/noaa_archive.phpv



Historical Crests for Connecticut River at Middletown

- (1) 28.20 ft on 03/21/1936
- (2) 25.75 ft on 09/24/1938
- (3) 21.27 ft on 06/02/1984
- (4) 20.44 ft on 10/17/1955
- (5) 20.44 ft on 08/20/1955
- (6) 18.69 ft on 04/07/1960
- (7) 16.90 ft on 04/08/1987
- (8) 16.70 ft on 01/02/1949
- (9) 16.68 ft on 03/30/1953
- (10) 16.05 ft on 03/04/1948
- (11) 14.93 ft on 04/19/2007
- (12) 13.89 ft on 10/17/1956
- (13) 13.76 ft on 04/25/1958
- (14) 13.70 ft on 03/16/1977
- (15) 13.62 ft on 04/02/1951
- (16) 13.50 ft on 04/04/1976
- (17) 13.45 ft on 04/06/2005
- (18) 13.40 ft on 06/04/1952
- (19) 12.98 ft on 04/19/1996
- (20) 12.96 ft on 04/02/2010**
- (21) 12.70 ft on 12/27/1981
- (22) 12.60 ft on 04/02/1998
- (23) 12.30 ft on 03/09/1979
- (24) 12.26 ft on 10/17/2005
- (25) 12.15 ft on 04/06/1959

Review of permits issued for 106-108 and 118 Newfield Street

The property has the following permits.

Planning Department Permits

- 1) Special Exception 1988-15(06/07/1998)- 20 one-bedroom units. (See appendix for 1988 Zoning Requirements and Assessment)
- 2) Subdivision 1988-28(06/08/1988)- 2 lot subdivision.
- 3) Lot line modification(06/12/1990)
- 4) Site Plan Review 2004-260(07/29/2004)- Addition of three single bedroom apartments on river side of building. (See appendix for 2004 Zoning Requirements and Assessment)
- 5) Site Plan Review 2004-330(09/28/2004)- Garage
- 6) Site Plan Review 2004-389(11/29/2004)- Addition of three one bedroom apartments on opposite side of building away from river.

Building Department Permits

- 1) #15263(03/11/1964)- 118 Newfield Street- Construction of 12 apartments
- 2) #16099(12/29/1988)- 106 Newfield Street- Foundation
- 3) #16139(01/31/1989)- 106 Newfield Street- Construction of 20 apartments
- 4) #16891(02/16/1990)- 108 Newfield Street- Renovation of Basement for Office and Storage
- 5) #17175(06/21/1990)- 106 Newfield Street- Addition of three apartments
- 6) #20285(08/26/1993)- 118 Newfield Street- Repair fire damage
- 7) #29069(08/26/2004)- 118 Newfield Street- Foundation permit
- 8) #29362-(12/07/2004)- 118 Newfield Street- Building and Foundation permit
- 9) #29395(12/23/2004)- 118 Newfield Street- Foundation for left side
- 10) #30207(09/14/2005)- 118 Newfield Street- Framing, Plumbing and Electrical permit

1964- Review of the Zoning Requirements

Application Summary

This approval was for a new construction 12 (one-bedrooms) apartments at 118 Newfield Street.



1964 Zoning Requirements

R-3 (General Residence) Zone

Height- No higher than 80 feet or the width of the street, which ever is lesser. The building is 2 stories and estimated to be between 20 and 30 feet in height.

Lot Yards- Minimum front yard of 10 feet is required. The actual front yard is 147.9 ft.

Minimum required side yard is 4 feet or one foot for each foot of wall height. The actual side yard, at its narrowest, is 21.2 ft.

Minimum required rear yard is 11 feet or one foot for each foot of wall height. The actual rear yard is 251.7 ft..

Lot Coverage- Maximum lot coverage is 25%. The amount of actual lot coverage is 2.2%.

Uses- The R-3 zone allows as a permitted use: Group houses, apartments, and tenements, social, fraternal and club buildings, hotels except when their facilities are intended primarily for the accommodation of transients.

Parking-

The parking requirements for a Office Building are found in section 40.04.13 of the zoning code and requires one and a half (1.5) parking space for each one bedroom apartments. The 12 one-bedroom apartments require 18 parking spaces..

Wetlands and Floodplain-

Inland Wetland and Watercourse regulations were not adopted until the mid 1970s. Floodplain regulations were not adopted until 1971.

1988- Review of the Zoning Requirements

Application Summary

This approval was for the construction of a new 20 (one-bedroom) unit apartment building at 106-108 Newfield Street and was approved by the Planning and Zoning Commission. This Project placed a very significant amount of fill on the already steep natural slope. Based on site conditions after the landslide it was obvious this material was not properly placed.



1988 Zoning Requirements

M Zone (Multiple-Family Zone) (22.00)

Lot Yards- Minimum front yard of 25 feet is required. The actual front yard is 147.9 ft.

Minimum required side yard is 10 feet or one foot for each foot of wall height. The actual side yard, at its narrowest, is 11.9 ft.

Minimum required rear yard is 10 feet or one foot for each foot of wall height. The actual rear yard is 221.7 ft..

Lot Coverage- Maximum lot coverage is 50%. The amount of actual lot coverage is 5.2%.

Uses- The M (Multi-family) Zone allows multi family uses as a Special exception (60.02.13). The number of units shall be in accordance with the lot size requirements shown below:

1 or no bedrooms: 4356 sq.ft./unit (10 units/acre)

2 bedrooms: 5445 sq.ft./unit (8 units/acre)

3 or more bedrooms: 7260 sq.ft/unit (6 units/acre)

The property is 2.22 acres. This would allow for 22 one bedroom units.

Parking-

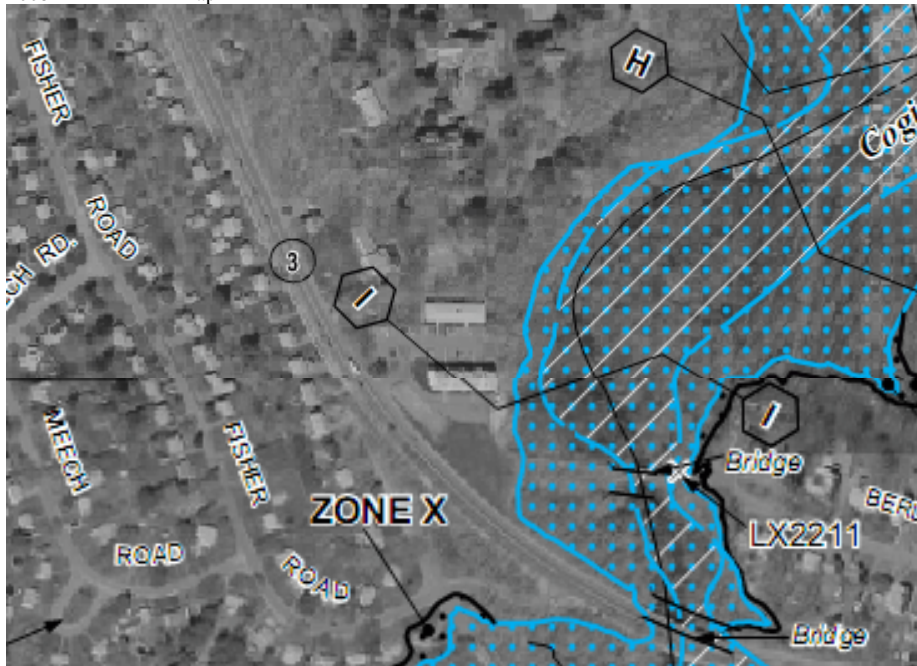
The parking requirements for a Office Building are found in section 40.04.14 of the zoning code and requires one and a half (1.5) parking space for each one bedroom apartments. The 20 one-bedroom apartments require 35 parking spaces..

Wetlands and Floodplain-

This property has no known wetlands, but has the Coginchaug River traversing its eastern portion. 118 Newfield Street is 130 feet away from the nearest Coginchaug River bank. 106-108 Newfield Street is 161 feet away from the nearest Coginchaug River bank (Topo Maps panel I8, April 17, 1980). In 1988 the regulated area that would require a review by the Inland Wetlands and Watercourses was fifty feet from the bank. In this case the structures were exempt from review.

The 20 unit building is located outside 2008 delineated floodplain zone (Firm Panel 0108G, Aug 28, 2008). The 2001 flood maps are less precise, in that they do not overlay an aerial photo. The Zoning Code, Section 46 at the time did not allow residential within a floodway or flood zone. The addition was located outside of these regulated areas, and therefore were not required to comply with these rules.

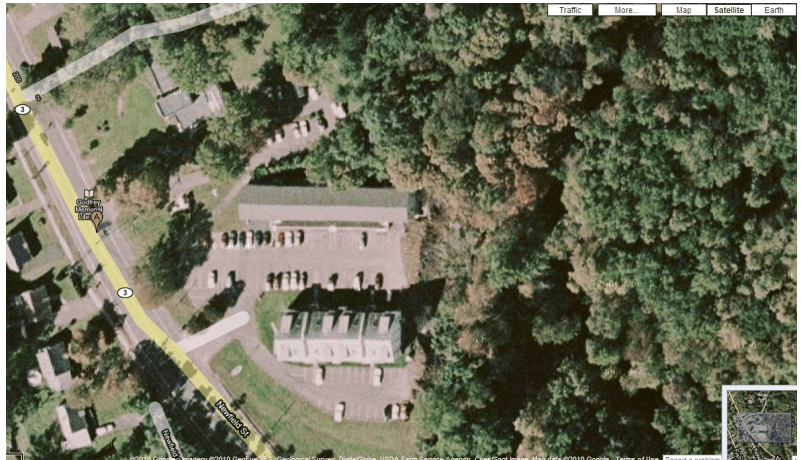
2008 FEMA FIRM Map



2004- Review of the Zoning Requirements

Application Summary

These approvals were for an addition of six one-bedrooms apartments onto an existing 12 (one-bedroom) unit apartment building at 118 Newfield Street. The first approval was for 3 units on the river side of the building. The second approval was for the 3 units on the opposite side of the building.



2004 Zoning Requirements

M Zone (Multiple-Family Zone)
(22.00)

Lot Yards- Minimum front yard of 25 feet is required. The actual front yard is 147.9 ft.

Minimum required side yard is 10 feet or one foot for each foot of wall height. The actual side yard, at its narrowest, is 11.9 ft.

Minimum required rear yard is 10 feet or one foot for each foot of wall height. The actual rear yard is 221.7 ft..

Lot Coverage- Maximum lot coverage is 50%. The amount of actual lot coverage is 6.8%.

Uses- The M (Multi-family) Zone allows multi family uses as a Special exception (60.02.13). The number of units shall be in accordance with the lot size requirements shown below:

1 or no bedrooms: 4356 sq.ft./unit (10 units/acre)

2 bedrooms: 5445 sq.ft./unit (8 units/acre)

3 or more bedrooms: 7260 sq.ft./unit (6 units/acre)

The property is 2.05 acres. This would allow for 20 one bedroom units, provided

Parking-

The parking requirements for a Office Building are found in section 40.04.14 of the zoning code and requires two (2) parking space for each one bedroom apartments.

The 23 one-bedroom apartments require 46 parking spaces..

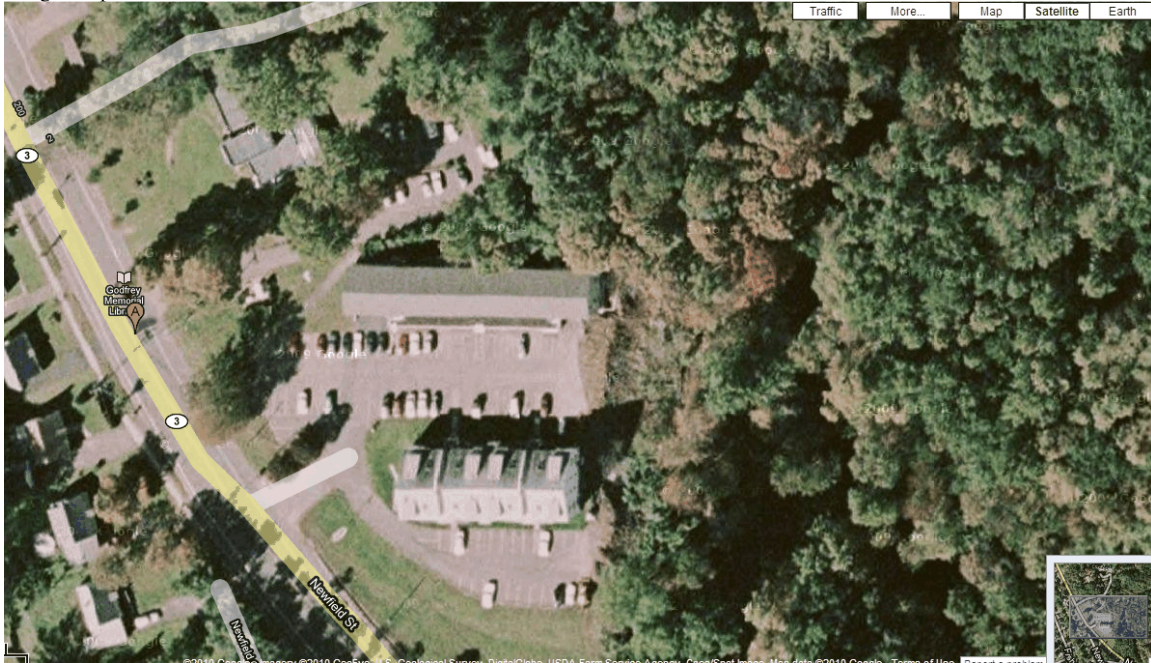
Wetlands and Floodplain-

This property has no know wetlands, but has the Coginchaug River traversing its eastern portion. 118 Newfield Street with the addition is 130 feet away from the nearest Coginchaug River bank. 106-108 Newfield Street is 161 feet away from the nearest Coginchaug River bank (Topo Maps panel I8, April 17, 1980). In 2004 the regulated area that would require a review by the Inland Wetlands and Watercourses is fifty feet from the bank. In this case the structures were exempt from review.

The 3 unit addition is located outside 2008 delineated floodplain zone (Firm Panel 0108G, Aug 28, 2008). The 2001 flood maps are less precise, in that they do not overlay an aerial photo. The Zoning Code, Section 46 at the time did not allow residential within a floodway or flood zone. The addition was located outside of these regulated areas, and therefore were not required to comply with these rules.

Review of aerial photos and topography maps

Google Maps- Aerial view – circa 2005 or 2006



Bing Maps- Birdseye view- Circa Spring 2007





City's Arcview Ortho Photos



1965 State Fly-over

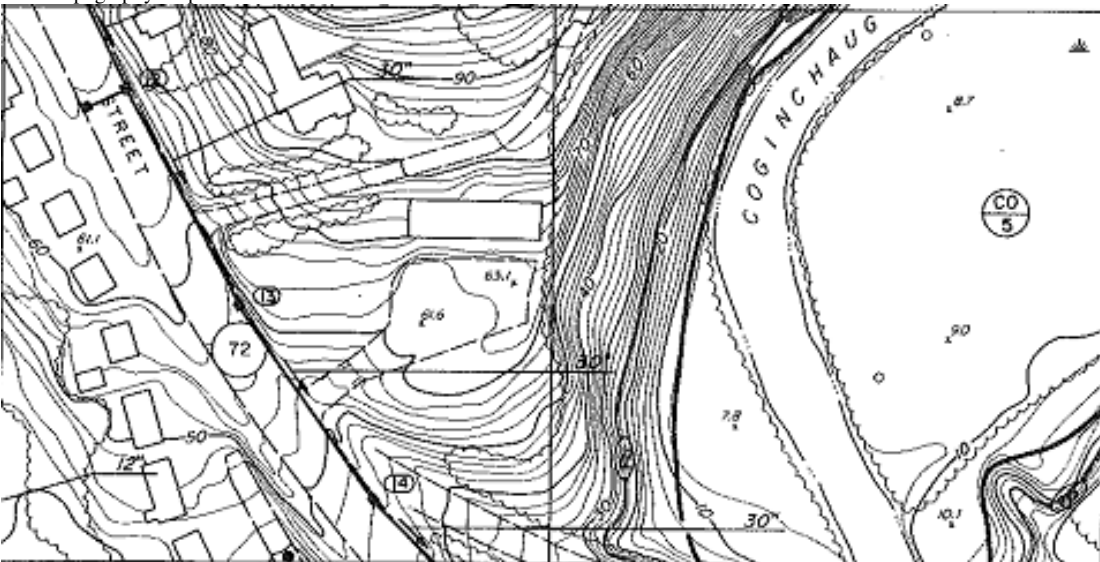


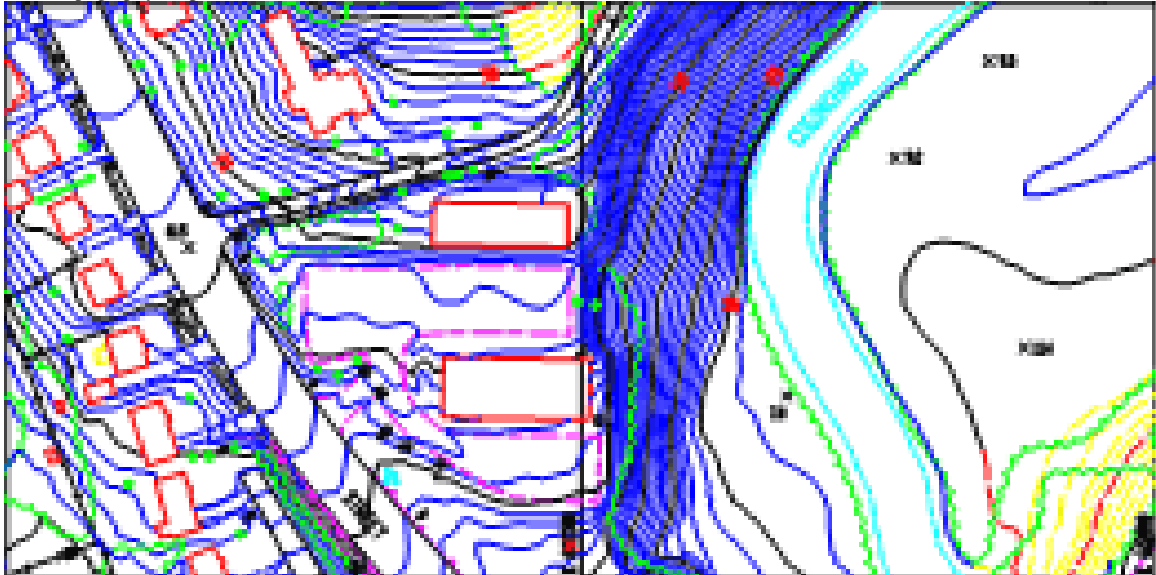
1934 State Fly-over



Topography Information

1981 Topography Map



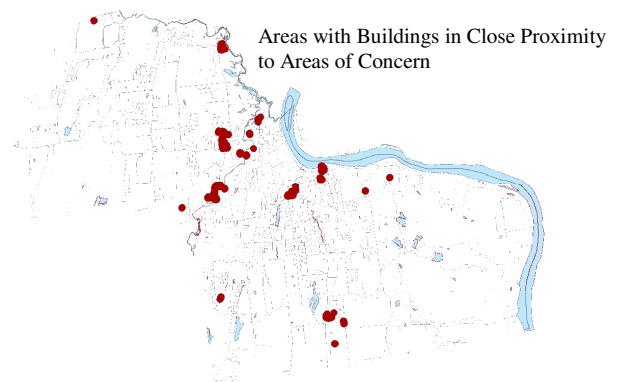
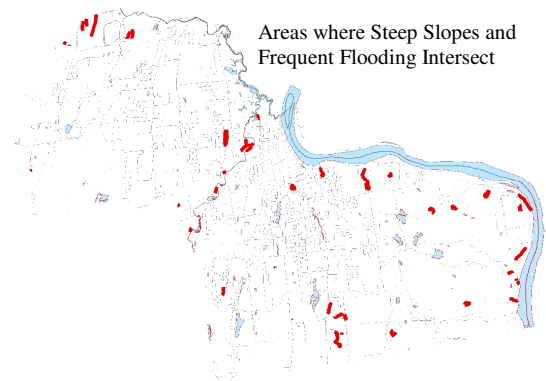
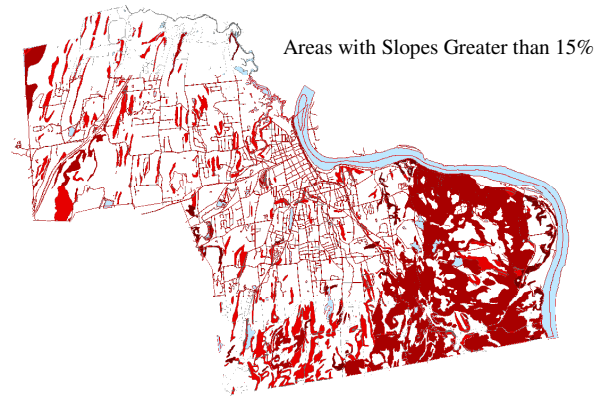
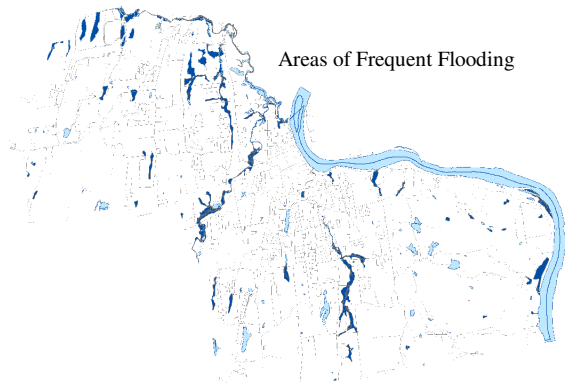


Areas where a similar event could happen

The following four maps show the locations of frequent flooding, areas with steep slopes, where they intersect and buildings in close proximity to these areas. 106-108 and 118 Newfield Street is one of the locations that is situated near an area of frequent flooding and steep slopes. Looking at other similar areas can help determine cause, either site characteristics, particular activities or other important data.

In reviewing the possible areas that this situation may be replicated, a location to the west of George Street reveals similar characteristics of steep slopes and frequent flooding. There have been drainage and flood concerns on George Street for years. This location is of interest, because of an event from October 1, 2006. On October 1, 2006, the construction site of Knoll Crest Apartments experienced a high amount of rainfall, 4.5 inches. This resulted in significant run-off of soil that overwhelmed George Street and clogged catch basins. The site was previously forested, but had recently been clear cut for the construction of the apartments. The 23 acre property without adequate vegetation and the heavy rains, over four inches that day, fell within period of less than two hours, liquefied the exposed soil and overwhelmed George Street below. The property did have erosion controls in place, but the attorney of the development described this as “an act of god”, and the required silt fences were not enough to maintain the run-off on the property.

In reviewing the other locations, many of them seem to not reveal any concerns, therefore it can be concluded that siting a structure within the letter of the law alone does not result in these types of events. Rather what the Newfield Street and George Street events reveal is that a significant rain event coupled with site activities can produce the possibility of either a landslide or a significant run-off event.



Conclusions

In reviewing the available information, there are likely a number of factors that contributed to the landslide, but this report can only make assumptions that are not backed up with technical or expert review.

There are two contributing factors:

- 1) Weather and
- 2) Poor property maintenance.

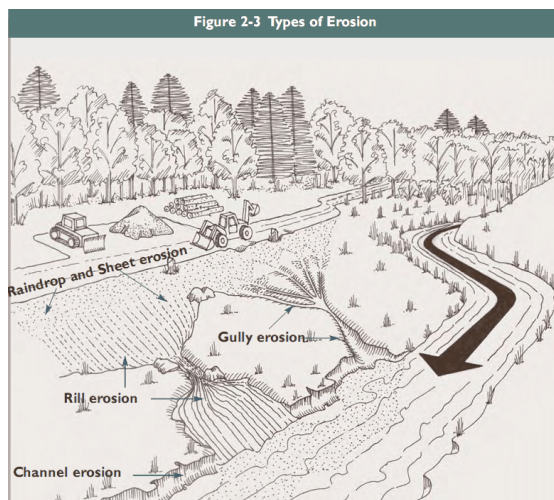
As reported above, the period of time when the landslide occurred was extremely active from a weather standpoint. While in previous years there were periods with greater rainfall (March 2007, 21.35 inches) there was no other March in the past five years that experienced four flash flood warnings. The combination of heavy rainfall over a sustained period with a prolonged period of possible flash flooding, likely is the key trigger to this landslide.

A review of historical rainfall reveals that average rainfall amounts have increased over the past thirty years. In 1975, Middletown officially had an annual rainfall amount of 50.34 inches. Today the official number is 52.35 annually. Averaging the actual rainfall amounts from the past five years the average is still higher, 53.67 inches. This period included three years where the average was higher, with the highest being 58.6 inches of rainfall in 2005.

Reviewing the frequency of high water on the Connecticut River, the list of record highs, shows that since records began being kept in 1936, 31% of the record highs occurred in the last five years (January 2005- July 2010).

The weather conditions certainly saturated the bottom portion of the slope making it much more susceptible to collapse. Additionally there is a very clear ground water that seeps midway down the slope when the water hits the hard pan, which contributed to slope saturation.

A review of the available aerial photos, indicate that poor property maintenance was likely a contributing factor, essentially the placement of fill on an already very steep slope. Comparing the Google aerial photo from summer 2006, shows a vegetated slope. However the Bing Maps Birdseye view from spring 2007 shows a different story. There seems to be some indication that the property owner was placing additional fill on the already steep slope.



Records show that the City issued a notice of violation letter to Ted Charton on September 17, 2007 for filling and excavating and/or grading occurring within 100 feet of an upland review area. The filling activity at the site was likely not properly seeded or reinforced to prevent erosion.

2002 Connecticut Guidelines for Soil Erosion and Sediment Control



Recommendations for moving forward

This report does not consider the permit process as being at fault (1964, 1988 and 2004). Since the developments were reviewed according to what was legally required at the time. The Planning and Zoning Commission does not have the ability to deny any proposed development, base on concerns that exist outside of the letter of law. The one review that would have helped, but was not available, would have been the requirement to secure an inland and watercourse permit. All proposed development activity was 161 feet away from the watercourse. The City of Middletown now has language in its Inland

Wetland and Watercourse regulation to allow review outside the 100 foot regulated area, but this language was not in effect in 2004 (date of last application).

“2.33- “Regulated area” is the geographic area in which the Agency reviews regulated activities in order to determine if such activities will likely impact or affect a wetland or a watercourse. It includes all wetlands and watercourses as defined herein plus all adjacent non-wetland, non-watercourse) areas measured horizontally from the established wetland or watercourse boundaries to a distance of one hundred (100’) feet. The regulated area will be extended by the Agency if the Agency determines that activities beyond the one hundred foot (100’) regulated area are likely to impact or affect a wetland or watercourse. (Amendment Effective 5/30/2006)”(Inland Wetlands and Watercourses Regulations)

However, the implementation of such authority is uncertain in respects to holding up in courts. The reason, as stated by Michael Zika in his What’s Legally Required (6th edition, 1997) is that:

“IWWAs are also entitled to enact and enforce reasonable regulations for activities occurring outside of an inland wetland or watercourse if the activity is likely to affect the wetland or watercourse. The Connecticut Supreme Court first confirmed that important principle in the case of Aaron v. Conservation Commission, 183 Conn. 532 (1981). However, legislative amendments passed in 1995 have made clear that the purpose of any such “buffer area” regulations must be to prevent impacts on the wetlands or watercourse itself. In other words, the regulations must be intended to protect the wetlands or watercourses and not to protect the buffer areas. In fact, the term “buffer area” itself has now been deleted from the Inland Wetlands and Watercourse Act, presumably because the term has been misunderstood to be an area designated for independent protection.

Because of the recency of the legislative amendments, it is not clear how much the courts may now restrict the ability of IWWAs to establish wide buffer areas.”

In looking to the future, developing regulatory language sooner that would have brought oversight to review any activity beyond 100 feet, would have been helpful in trying to prevent or limit a reoccurrence at 106-108 and 118 Newfield Street. However, regulatory language can not be site specific and would likely have broader implications or unequal enforcement that does not help strengthen the city’s capacity to prevent landslides in the future.

The existence of flooding and steep slopes alone do not immediately warrant new regulation to govern development activities. The key with the Newfield Street landslide is poor property maintenance practices. Indiscriminant filling, excavating or clearing of slope stabilizing vegetation in these areas could result in the possibility of precipitating a landslide.

Therefore this report believes that there is reason for further examination with respects to current policy. The following steps should be considered:

- 1) Review of the 2002 Connecticut Soil and Erosion guidelines to determine what additional regulation, if any, can be legally implemented to ensure best practices reflected in our Zoning Code or Inland Wetlands Regulations.
- 2) Review monitoring of active property developments and recognized areas with steep slopes that are most at risk during the construction season, since any development activity could reduce protective vegetation
- 3) Review enforcement procedures with poor property maintenance violations and ensure that these activities are not only halted, but corrective action is undertaken to prevent erosion of private property on to abutting properties.

APPENDIX